congatec

Product Guide
Spring 2015

congatec

We simplify the use of embedded technology

Gerhard Edi, Chief Executiver Officer
Our embedded technologies are ideally suited for the Internet of Things

Matthias Klein, Chief Operating Officer
With our EDM services we make the implementation of customer applications easier and more cost effective

congatec AG is approaching global market leadership in the segment of Computer-On-Modules. In a report by information and analytics provider IHS Inc. - "Standalone Boards, Computer-on-Modules and PICMG 1.x" - congatec ranks no. 1 in terms of revenue for computer modules in Europe, the Middle East and Africa (EMEA). The driving force behind this success is a clear product focus together with global expansion into new regions. Toby Colquhoun, senior analyst embedded modules for IHS Technology, indicated: "The COM market has typically grown between 10 to 15 percent per year, for the past five years. congatec has moved from a start-up company to one of the largest embedded suppliers in less than a decade. According to our analysis, congatec had the highest sales, in terms of revenue, in EMEA for COM technology and the second-highest worldwide."
congatec CEO Gerhard Edi: "Our embedded technologies are ideally suited to provide solutions to current mega trends such as the "Internet of Things", data security and energy efficiency. We work very closely with our technology partners Intel, AMD and Freescale in the development of our products, which have gained a market reputation for their reliability. This is an optimal starting point for continued rapid growth."

In order to support customers throughout the entire product lifecycle, congatec added EDM (Embedded Design & Manufacturing) services to its portfolio. Customers benefit from congatec's rich experience as a manufacturer of high quality computer modules leading to reduced development time and costs. Existing know-how and infrastructure make it possible for customers to outsource custom designs and solutions to congatec. As a single supplier covering the complete range of cost-effective standard solutions to individual EDMS projects, congatec supports the full range of technology platforms – from x86 to ARM including standard form factors such as specialized single board computers and computer modules. For EDMS projects, congatec acts as a service provider supporting the specific system designs of customers. congatec's EDMS support starts at the design phase and includes project management, the development of specific hardware and software, production control, system integration and global logistics, as well as the provision of technical support.
"We are convinced that our new services will add even greater flexibility to the development of embedded solutions. We will make the implementation of customer applications easier and more cost effective, thereby giving our customers a greater competitive advantage", says congatec COO Matthias Klein.

10 years of congatec
Established in December 2004 by 13 former JUMPtec employees, the company has grown steadily to its current team of 177 employees. The history of congatec is a true success story. In just a decade the company has established itself as the market leader for computer modules in EMEA – and the success story will continue.
A key reason for congatec's success is the consistent strategy of corporate expansion. Today, congatec has six subsidiaries located in Taiwan, Japan, China, the US, Australia and the Czech Republic. In addition, the company has worldwide distribution agreements with major partners.

New branding
The new company logo, introduced during November 2014, reflects the extended offering and highlights the diversity of the new congatec brand. congatec is no longer the just a COM company and is about to become a solution provider. "We simplify the use of embedded technologies" is the congatec promise, everything we do is based on this statement.

Successful 2015
congatec CEO Gerhard Edi explains: "Thanks to our highly professional global workforce and a business strategy that always has the best interest of the customer in mind, the start-up from 2004 has become a serious player in the international embedded market with a sales volume of about 85 million US dollars during the 2014 fiscal year.
We are proud of this development and of our exceptional team that has made this success possible.
Our past accomplishments are also an incentive towards our our goal to be among the five leading embedded solution providers worldwide by 2020."

congatec
International Partnerships

Economical Principal
congatec products and technologies offer innovative solutions for the commercial and industrial use of embedded computer technology.

Module Know-How
The congatec engineering teams are committed to embedded module technology. This vast amount of knowledge allows for superior hardware and software support for our customers.

Quality
congatec AG is certified in compliance with ISO9001. All congatec products are made to meet the highest quality standards.

Software and Driver Support
congatec offers advanced Board-Support-Packages, which include both the latest tested drivers from silicon vendors and the congatec specific drivers for accessing all of our additional embedded module features.

BIOS Expertise
congatec has an experienced engineering staff for BIOS UEFI and board controller firmware development. The congatec implementations expands the functionality to enable professional industry applications.

System Integration
When designing a system, special attention must be paid to issues such as heat dissipation, electrostatic / electromagnetic compatibility, signal compliance, mechanical system design, and etc. By using congatec products, you gain access to congatec's experience, which will help you deal with these issues. You can also opt to utilize our Module+ program to out-source single engineering tasks or a complete system design to congatec.

Design-In Support
The congatec teams are committed to provide the best design-in support to customers. This enables a perfect fit of the congatec Computer-On-Modules to the customer's carrier boards.

Lifecycle Support
congatec offers life cycle support for the complete lifetime of the product. congatec pays close attention to component life cycles in order to provide advanced end-of-life product notifications.
In addition, congatec focuses on efficient processing of repairs including, when applicable, replacement modules.

Focussing on core competencies
Embedded computing is congatec's passion. The clear focus on Computer-On-Modules results in a high degree of specialization for the experienced congatec employees. Accessing this power and industry knowledge allows for customers to focus on their special application know-how and industries.

ISO 9001 CERTIFICATION Intertek™

TECHNOLOGY PARTNERSHIPS

Intel®
IoT Alliance Solutions – Associate member

Intel®
Technology Provider – Platinum member

AMD® Fusion
Partner Premier

Adeneo Embedded
Software Partner

COM Express® design guide Rev. 1.0 editor
COM Express® Rev. 2.0 / 2.1 editor

XTX™ Founding member
XTX™ Specification & design guide editor

PICMG® Executive Member

Qseven® Founding member
Qseven® Specification & design guide editor

SGET e.V. Founding Member
SGET e.V. Board Member

freescale™
Technology Partner

congatec

Business Segments

INDUSTRIAL AUTOMATION

Industrial Automation is a conservative Market with strong focus on reliability and long term perspectives. Demanding environments require highest, industry-proof quality and longevity. Standards and scalability enable right sized platform concepts with easy upgrade paths as well as guaranteed future.

ENTERTAINMENT

Entertainment spans from simple Handheld devices to arcade-style high-end gaming machines with high-performance graphics capabilities. The module concept and the industrial single board computers fit perfectly to the industry's demand for unique scalable and application ready platforms. This makes it easy to implement latest platforms with highest performance at lowest cost for development and certification.

MEDICAL

Medical has a unique demand for highest safety and reliability meeting regulatory requirements. Applications range from demanding computing requirements for optical Analysis like CRT, MRT and Ultrasonic to compact, low power mobile diagnostic and supportive equipment. Ultra mobile, low-power, battery-operated devices with highly interactive graphical user interfaces are a rapidly growing emerging segment.

TRANSPORTATION

This applications require highest levels of robustness, reliability and longevity in demanding environment. Applications span from custom automotive equipment to kiosk and signage use for public transportation as well as to freight tracking and delivery control.

ENERGY

The intelligent use of renewable energies is highly dependent on proper process control to ensure maximum efficiency even in a harsh environment. Power distribution control challenges with demand for highest computing performance and reliability.

INTERNET OF THINGS

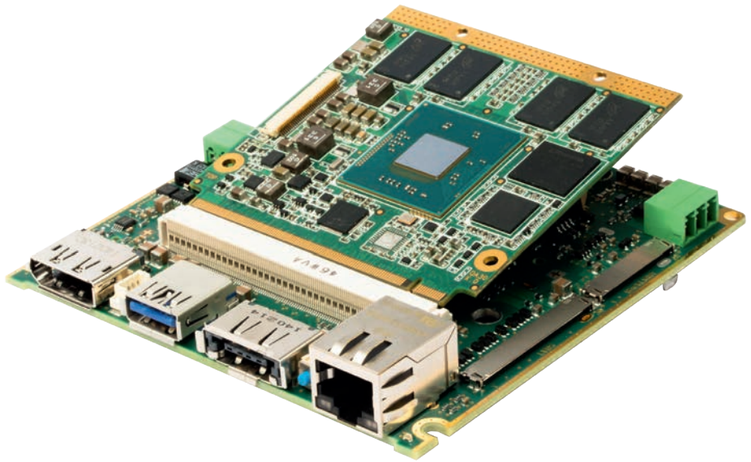
A key enabler for new IoT appliances is the right processor technology platform to allow for intelligent connected devices. To achieve lowest R&D costs, the platform need to be standardized. As time to market is an increasingly important competitive factor, simplified development paired with highest data security levels are required.

POINT OF SALE (POS)/KIOSK

This dynamic market is powered by the trends to cashless payment and comfortable self-service stations. Applications range from small and mobile payment devices up to full featured, networked information kiosks and vending machines with touch control.

COM Advantages

when compared to a Full Custom Design



Lower Costs
COMs save money. The cost of the development and end product are dramatically reduced. This holds true for the product's entire life-cycle. COMs provide a cost advantage from the very start.
– Lower engineering cost
– Lower product cost
– Lower cost of life cycle management

Reduced Risk
COMs minimize risk. Basic changes during the design phase, or in the middle of a product's life cycle, are easily managed. Simply plug in the next-generation COM module and continue. COMs allow for easy upgrades.
– Lower design risk
– Lower transition risk

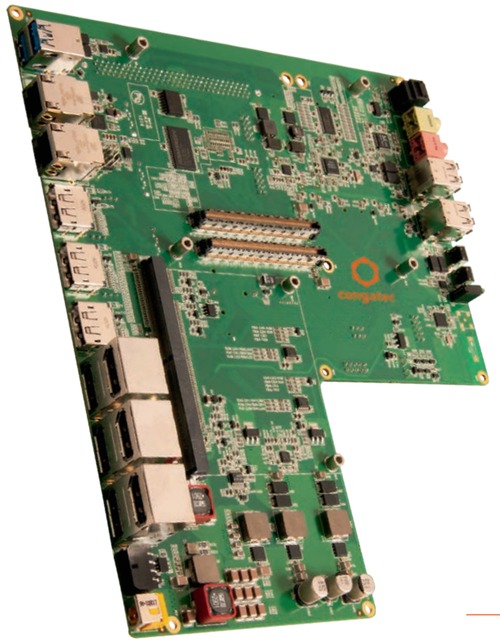
Improved Flexibility
COMs are flexible and can meet all performance requirements. The modules support a wide range of performance up to the Intel® Core™ i7 processor, as well as future architectures. The COM standards are well established and are already prepared for the future.
– Scalability
– Performance upgrades are easy
– Technology upgrades are easy

Time-To-Market Advantage
COMs put you in a leading position. The use of customized carrier boards reduces necessary engineering effort by separating your design work from the embedded PC technology. Use COMs in your design and you can stay focused on your own core competency.
– Faster time to market
– Faster engineering
– Faster reaction time to market changes

COM Standard	COM Express® Type 2	COM Express® Type 6	COM Express® Type 10
Size	Basic 95 x 125 mm², Compact 95 x 95 mm², Mini 55 x 84 mm²		
Bus	PCI Express® max. 22 Lanes, PCI, LPC, I²C	PCI Express® max. 24 Lanes, LPC, I²C	PCI Express® 4 Lanes, LPC, I²C, CAN
SATA/SDIO	4x / -	4x / 1x	2x / 1x
USB 2.0 / Ethernet	8x /1x 1 GBit	8x (4x USB 3.0)/1x 1 GBit	8x (2x USB 3.0)/1x 1 GBit
Audio	Digital (AC'97 / HDA)	Digital (HDA)	Digital (HDA)
Display Interface	VGA / TVout / LVDS / 2x SDVO or PEG	VGA / LVDS (alt. eDP) / SDVO / 3x HDMI/DP / PEG	LVDS (alt. eDP) / SDVO / 1x HDMI/DP
I/O Bandwith over all (no Panel Signals)	up to ~12.4 GByte/s	up to ~26.4 GByte/s	up to ~5.5 GByte/s
Software Interface (API)	cgos / EAPI		
Homepage	www.picmg.org		

COM Standard	Qseven®	ETX®	XTX™
Size	70 x 70 mm²	95 x 114 mm²	
Bus	PCI Express® 4 Lanes, LPC, I²C, CAN, UART	PCI, ISA, I²C	PCI Express® 4 Lanes, PCI, LPC, I²C
SATA/SDIO	2x / 1x	- / -	4x / -
USB 2.0 / Ethernet	8x (2x USB 3.0)/1x 1 GBit	4x / 1x 100 MBit	6x / 1x 100 MBit
Audio	Digital (HDA)	Analog	Analog / Digital (AC'97 / HDA)
Display Interface	LVDS (alt. eDP) / SDVO / DisplayPort / HDMI	VGA / TVout / LVDS	
I/O Bandwith over all (no Panel Signals)	~5.5 GByte/s	~0.6 GByte/s	~3.3 GByte/s
Software Interface (API)	cgos / EAPI		
Homepage	www.qseven-standard.org www.sget.org	www.etx-ig.com	www.xtx-standard.org

EDM Services
for embedded designs



COM Express carrier board design with 9 DisplayPort video channels for video wall applications

congatec supports customer developments throughout the entire product life cycles with EDM (Embedded Design & Manufacturing) services.
Customers benefit from congatec's rich experience as a manufacturer of high quality computer modules with synergistic effects leading to reduced development time and costs.

Passive cooled digital signage controller with Intel® Core™ i7 performance

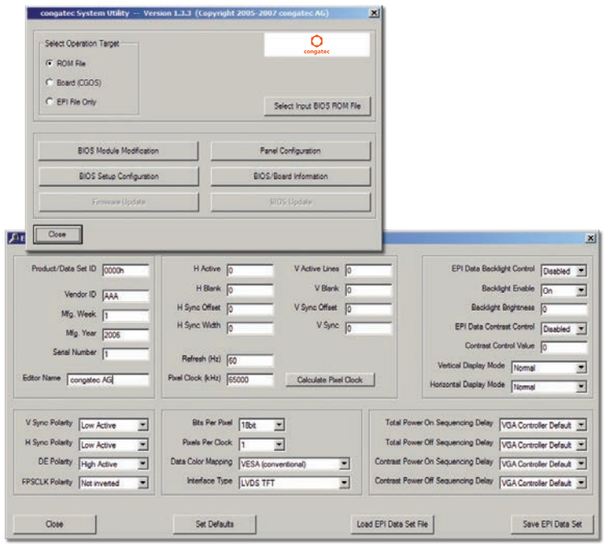
congatec's EDMS support

congatec's EDMS support starts at the design phase and includes project management, the development of specific hardware and software, production control, system integration and global logistics, as well as the provision of technical support.

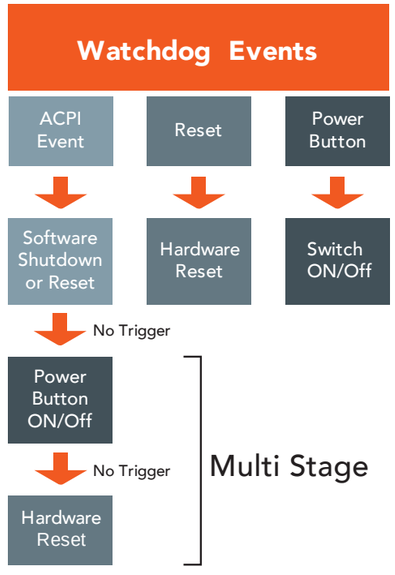
- Services for Customized Designs
- Modules Customization
- Custom Designed Carrier Boards
- Customized Single Board Computers
- Full Custom Hardware Designs
- Standard and Special Cooling Solutions
- Housing Design and Manufacturing
- System Integration with Certifications
- Efficient High Quality Production Services

Existing know-how and infrastructure make it possible for customers to outsource custom designs and solutions to congatec. As a single supplier covering the complete range of cost-effective standard solutions to individual EDMS projects, congatec supports the full range of technology platforms – from x86 to ARM, and from standard form factors to specialized single board computers and computer modules. For EDMS projects congatec acts as a service provider supporting the specific system designs of customers.

congatec embedded BIOS / UEFI



congatec System Utility



Multi Stage Watchdog Timer

Embedded computer users usually require more than the standard functionality of an office computer. congatec has taken these requirements into account when designing BIOS / UEFI functionalities. Based on our large amount of BIOS and UEFI experience, we have implemented the embedded requirements into our powerful congatec BIOS / UEFI platform.

Optimized Power
ACPI Power Management and System Configuration is supported by the congatec BIOS / UEFI according to the ACPI specification.

Multi Stage Watchdog Timer
All congatec modules are equipped with a multi stage watchdog timer supporting different events such as ACPI event, hardware reset or power button. It can either assert a single event and / or any combination of these events.

congatec Board Controller
An onboard µc fully isolates some of the embedded features, such as system monitoring or the I²C bus, from the x86 core architecture. This results in higher embedded feature performance and higher overall system reliability.

Fast Mode I²C Bus
The I²C Bus is a simple serial bus interface often used for sensors, converters or data storage in embedded applications. All congatec modules offer a 400 kHz multi-master I²C Bus that provides maximum I²C bandwidth.

BIOS Setup Data Backup
The BIOS CMOS settings are held in flash memory to allow battery-less applications.

Manufacturing Data Storage
The congatec board controller provides a rich data set of manufacturing and board information: Serial Number, Article Number, EAN Code, Manufacturing and Repair Date, System Statistics and more. The BIOS also keeps track of dynamically changing running time and boot count data. All this data is accessible by a uniform API.

User Data Storage Area
congatec modules provide 32 Bytes of non-volatile storage in the EEPROM and a 64 kByte block in the BIOS flash memory.

Hardware Monitoring
The congatec BIOS has the routines to monitor critical components implemented. Fans, operating voltages and several temperature sensors can be monitored without incurring additional development costs.

Display Auto-detection
The LVDS flatpanel can be autodetected by the BIOS via EDID support or set as fixed panel timing in BIOS setup.

OEM BIOS Logo
The BIOS can display a custom logo instead of the tradional diagnostic output during POST.

OEM Customization - Do It Yourself BIOS
The congatec embedded BIOS allows customers to do create their own BIOS binary by adding OEM code and data modules. These OEM modules help reduce the need for customized BIOS versions.

OEM BIOS Code
Customer specific code can be executed while booting the system. During power on self test (POST) the congatec BIOS can give control to customer specific code. This gives customers more flexibility to initalize special hardware extensions.

OEM CMOS Defaults
The congatec embedded BIOS allows the customer to store their own defaults in flash memory.

OEM Verb Table
To initialized HDA codecs on the carrier board from BIOS level.

OEM SLP string and OEM SLIC Table
Helps to activate licensed copies of a Windows operating system (OS) so end users of the embedded system will not have to activate the OS themselves.

OEM EDID for LVDS Panel
Create your own EDID data for any LVDS flat panel and add to the list of predefined Timings offered in the BIOS setup.

congatec System Utility
All embedded BIOS features are accessible through the use of a congatec Windows tool. This includes all manufacturing and statistical information; e.g. serial number, running hours, boot counter etc. BIOS default settings, bootlogo and flat panel configurations can easily be programmed using this flexible and powerful tool.

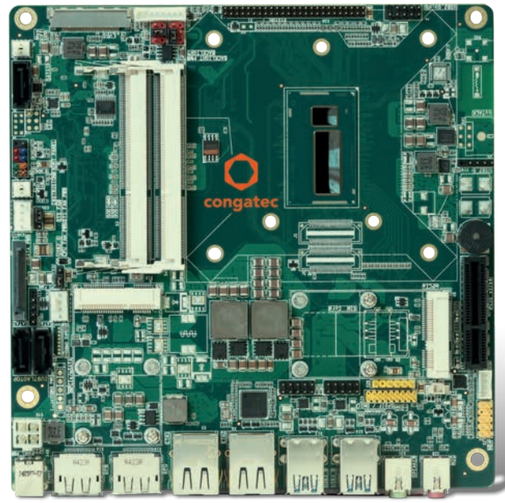
32/64 Bit Uniform OS API
The congatec embedded BIOS Features are accessible through the uniform APIs EAPI (a PICMG® definition) and CGOS.

Board Support Packages
congatec offers advanced BSPs, which include both the latest tested drivers from silicon vendors and the congatec specific drivers for accessing all of our additional embedded BIOS and module features.

congatec Industrial Single Board Computers

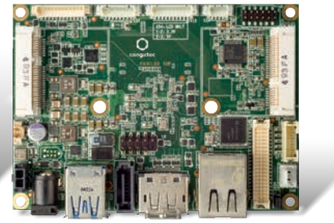
The use of Single Board Computers is an easy and fast way for creating industrial computing applications when no special functionalities are required. This can be an alternative to the more flexible Computer-On-Modules approach.

Thin-Mini ITX 170 x 170 mm²
at a maximum height of 20 mm



Picture Connectors Pico-ITX

Pico-ITX 100 x 72 mm² for most compact industrial SBC solutions



Mini-ITX, Thin Mini-ITX and Pico-ITX

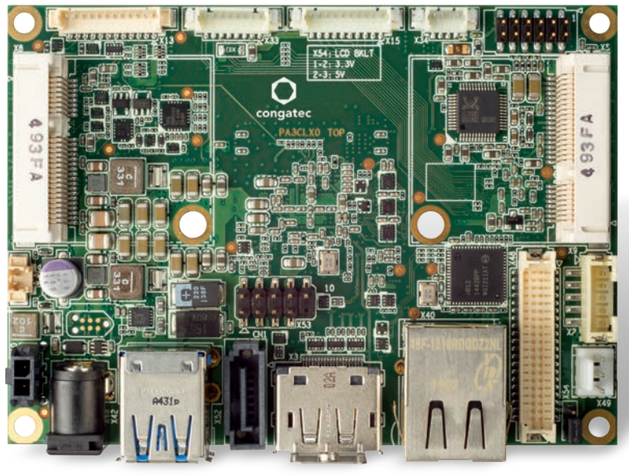
The congatec Single Board Computer implementations offer affordable picing, embedded features and industrial reliability.
On top of the rich interface selection the congatec SBCs offer many extra features to allow for industrial use:

- Lowest power consumption utilizing embedded mobile CPUs
- Passive cooling option
- 24/7 operation
- Ceramic capacitors for extended lifetime
- Extended temperature options for harsh environment
- Long term availibility 7+ years
- Customization of hardware and BIOS/UEFI possible
- Extreme flat solutions based on the Thin Mini-ITX standard with max. height of 20mm
- Expandable by PCI Express and Mini PCI Express slots
- BIOS/UEFI adaptations
- Enhanced security features with optional TPM chip

When desktop boards reach their limits then the congatec SBCs are first choice.

congatec Industrial Single Board Computers

Product Overview



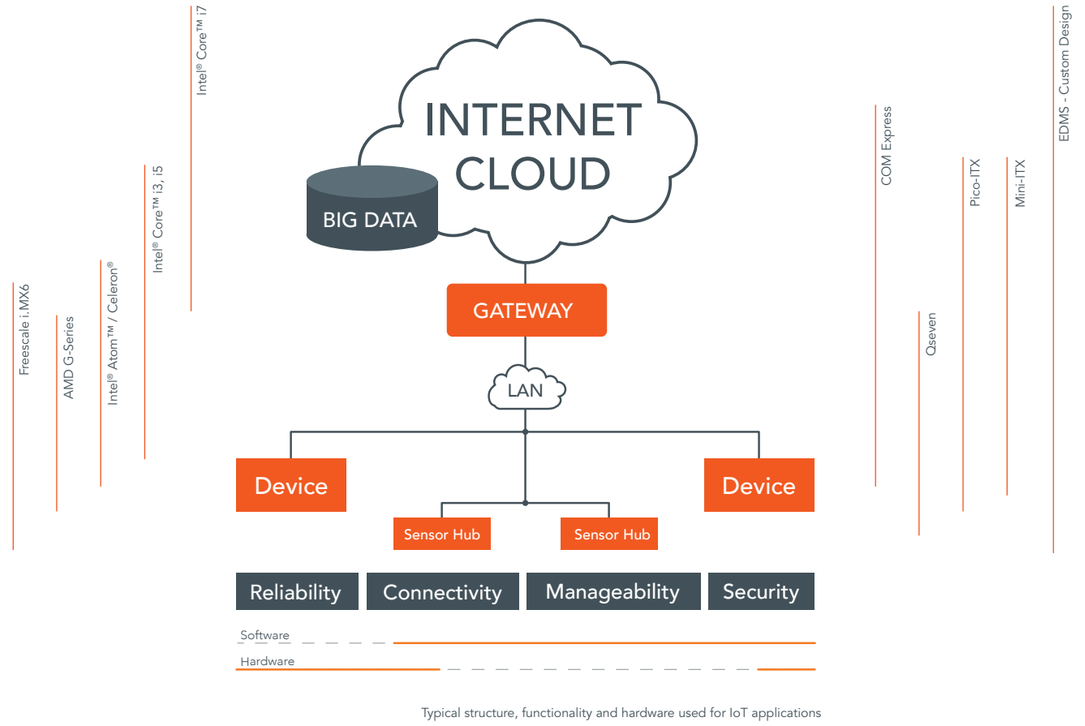
72 x 100 mm²

conga-PA3
– Small Size Single Board Computer 72 x 100 mm²
– Based on the latest generation Intel® Atom™ processors
– Industrial operation temperature -40 .. +85°C
– 24/7 operation
– congatec embedded BIOS / UEFI
– Ideal platform for IoT solutions

	conga-PA3	conga-IGX	conga-IA3	conga-IC87	conga-IC97
Formfactor	Pico-ITX, 72 x 100 mm²	Mini-ITX, 170 x 170 x 40 mm³		Thin Mini-ITX, 170 x 170 x 25 mm³	
CPU	3rd Gen Intel® Atom™ E3845, 4x 1.91 GHz, 10 W E3826, 2x 1.46 GHz, 7 W	AMD G-Series Processors GX-210HA, 2x 1.0 GHz, 9 W GX-217GA, 2x 1.65 GHz, 15 W GX-420CA, 4x 2.0 GHz, 25 W GX-412HC, 4x 1.2 GHz, 7 W GX-222GC, 2x 2.2/2.4 GHz, 15 W	3rd Gen Intel® Atom™ E3845, 4x 1.91 GHz, 10 W E3826, 2x 1.46 GHz, 7 W Celeron® J1900, 4x 2 GHz Celeron® N2930, 4x 1.86 GHz	4th Gen. Intel® Core™ i7-4650U, 2x 1.7/3.3 GHz, 15W i5-4300U, 2x 1.9/2.9 GHz, 15W i3-4010U, 2x 1.7 GHz, 15W Celeron® 2980U, 2x 1.6 GHz	5th Gen. Intel® Core™ i7-5650U, 2x 2.2/3.1 GHz, 15 W i5-5350U, 2x 1.8/2.9 GHz, 15 W i3-5010U, 2x 2.1 GHz, 15 W
DRAM	max. 4 GByte on board DDR3-1066	Support for 2x SODIMM Socket, max. 16GB, single channel DDR3-1333/1600	Support for 2x SODIMM Socket (dual channel up to DDR3L-1333), max. 16GB	Support for 2x SODIMM Socket (dual channel up to DDR3L-1600) max. 32GB	
Ethernet	Gbit LAN 1x Intel i211 (i210 for industrial version)	Dual Gbit LAN 2x Realtek RTL 8111G	Dual Gbit LAN 2x Intel i211	Dual Gbit LAN 1x Intel i218LM AMT 9.5 supported 1x Intel i211	
Serial ATA	1x SATA III 1x mSATA III	1x mSATA III 2x SATA III	2x SATA III 1x mSATA III	3x SATA III 1x mSATA III	
PCI Express	1x miniPCIe 1x miniPCIe Half Size	PCIe x4 Slot (Gen.2)	1x PCIe x1 Slot 1x mPCIe 1x mPCIe Half Size	PCIe x4 Slot (Gen.2) 1x Full/Half-size Mini PCIe Slot with SIM slot 1x Full/Half-size Mini PCIe Slot	
USB	2x USB 3.0 2x USB 2.0 1x USB Client	USB 2.0 for internal stick 2x USB 2.0 internal 2x USB 3.0 internal 4x USB 2.0 external	2x USB 2.0 external 2x USB 3.0 external 2x USB 2.0 internally	4x USB 2.0 internal 4x USB 3.0/2.0 external	
IOs		PS/2 Keyboard/Mouse 2x RS232 external 1x RS232 internal 8 Bit GPIO internal	8 Bit GPIO internal	1x Serial internal 1x Serial external 8 Bit GPIO internal	
Sound	Line Out Mic In S/PDIF Out	Audio In/Out SPDIF OUT	Audio In/Out 1x Front Panel HD Audio	Audio In/Out 1x Internal stereo speaker 1x Digital Microphone (SPDIF) 1x Front Panel HD Audio	
Graphics	Generation Intel® HD Graphics	Integrated AMD Radeon™ HD Graphics	Enhanced Intel HD Graphics Generation 7	Next Generation Intel® HD Graphics	
Video Interface	1x 24-bit Dual Channel LVDS 1x DiplayPort++	1x DisplayPort++ 1x DVI Backlight Inverter 2x 24 Bit LVDS	1x DisplayPort++ 1x VGA 1x LVDS (2x24 bit) 1x Embedded DisplayPort 1x Backlight (Power, control)	2x DisplayPort++ 1x Backlight (Power, control) 1x LVDS (2x24 bit) 1x Embedded DisplayPort 1x opt. CEC	
congatec Board Controller	Multi-Stage Watchdog, non-volatile User Data Storage, Manufacturing and Board Info, Board Statistics, BIOS Setup Data Backup, I²C bus (fast mode 400 kHz, multi-master), Power Loss Control	-	Multi-Stage Watchdog, non-volatile User Data Storage, Manufacturing and Board Information, Board Statistics, BIOS Setup Data Backup, I²C bus (fast mode 400 kHz, multi-master), Power Loss Control		
Embedded BIOS Feature	AMI Aptio® (UEFI) BIOS; SM-BIOS BIOS Update, Logo Boot, Quiet Boot, HDD Password	AMI Aptio® (UEFI) BIOS Recovery BIOS, SM-BIOS BIOS Update Quick / Quiet / Logo Boot integrated HW diagnostic tool EraseDisk Option	AMI Aptio® (UEFI) BIOS; SM-BIOS BIOS Update, Logo Boot, Quiet Boot, HDD Password		
Security		Socket for TPM 1.2 module	Optional onboard TPM 1.2	Optional onboard TPM 1.2 / 2.0	
Power	1x internal DC-In (12V) 1x ext. DC-In (12V) 1x opt. battery header for battery manager	Onboard (internal input) DC-In 12V / 19-24V Onboard Power Output (+5V/2A, +12V/2A) for drives 1x DC-In (external input) 12V / 19-24V @ 5A max.	1x internal DC-In (12-24V) 1x opt. battery header for battery manager (SBM3) 1x ext. DC-In 12V-24V	1x internal DC-In (12-24V) 1x opt. battery header for battery manager (SBM3) 1x external DC-In 12-24V	
Operational Temperature	0 to +60°C -40 to +85°C (industrial)	0 to +60°C			

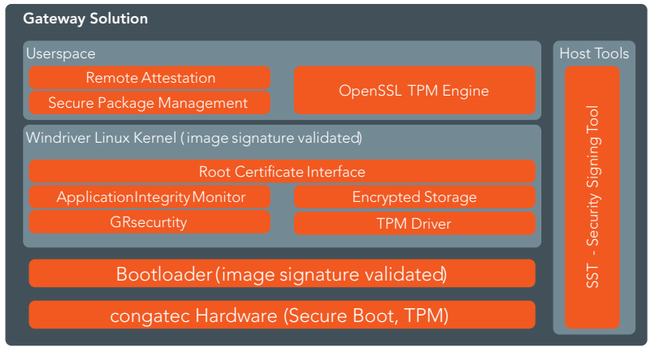
congatec
Internet-of-Things Solution

The combination of the conga-QA3 Qseven module based on the Intel® Atom™ processor E3800 family with the validated software package from Intel, Wind River and McAfee provides new services based on the connection of devices with each other and the cloud.



Typical structure, functionality and hardware used for IoT applications

Software functionalities for an typical IoT application

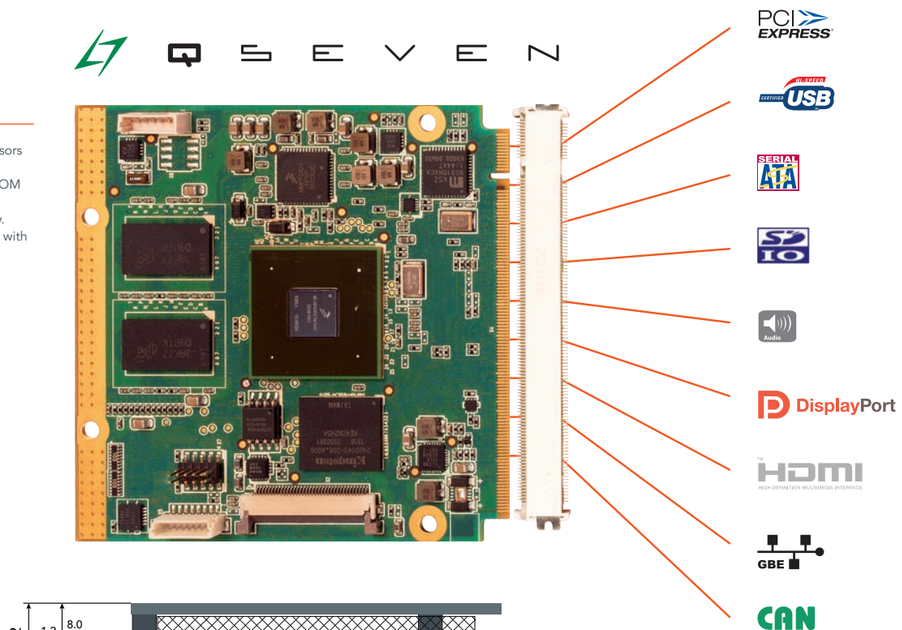


To allow for a quick and easy start of an IoT application congatec created a development kit containing all components for a rapid prototype. Additionally to a Qseven Module based on the latest Intel® processor a compact IoT Carrier-Board, a 7" LVDS touch display, a power supply and all required cables and accessories are included. The most important part is the included software. The "Intel IoT Gateway Solution" covers all aspects of connectivity, manageability and security.
This allows that the engineers can focus mostly to their specific IoT application. The combination of the conga-QA3 with the validated solution stack of the Intel Gateway Solutions for IoT provides a pre-integrated and open platform to bring secure IoT solutions to market quickly. congatec simplifies the use of embedded technology.

Qseven®
the Mobile COM Definition

Targeting next generation ultra mobile embedded processors built using latest mobile chip technologies, the Qseven® format complements the low power and small size of these processors. By exploiting the small form factor of the industry's latest processors, the Qseven® format offers high performance computing power, delivered in a module measuring only 70 x 70 mm².

Qseven® also supports ARM processors for mobile and ultra low power consumption applications. Unlike COM Express®, XTX™ and ETX®, it is not limited to x86 processor technology. One carrier board can be equipped with x86 or ARM Qseven® modules.



conga-QMX6 original size

Freedom
Qseven® allows for the use of non x86 processor architectures. It supports the low power mobile ARM processor architecture. Customers have the freedom to use all kinds of Qseven® modules without the need to change the carrier board.

Mobile Applications
Qseven® is unlike previous Computer-On-Modules (COM) standards due to its primary focus being directed towards mobile and ultra mobile applications.

Low Power
Qseven® is defined for a maximum power consumption of 12 Watts. It is designed to be operated by single 5 Volt DC power and provides all additional signals for battery management. This simple power requirement allows for small mobile solutions powered by compact two cell batteries.

Connector
Unlike most previous module standards, Qseven® does not require an expensive board-to-board connector. Instead, it utilizes a very affordable MXM card slot with 230 pins in a 0.5 mm configuration.

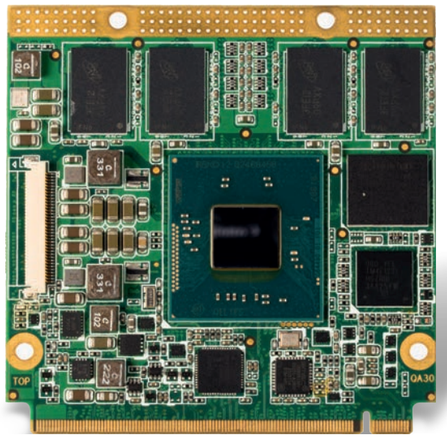
Legacy Free
Qseven® is a legacy free standard focused on high speed serial interfaces such as PCI Express® and Serial ATA. Qseven® omits support for legacy interfaces like EIDE and PCI, in order to provide ideal support for today's, as well as future, CPU's and chipsets.

Compact Size
The module's dimensions are a mere 70 x 70 mm². This means it can be easily integrated into size constricted systems.

Slim Design
Compared to COM Express®, Qseven® enables slimmer mechanical housings.

SGeT e.V.
The Qseven® Specification is hostet by the 2012 founded SGeT standardization group. congatec is founding member, board member and Qseven® development team member of the SGeT.

Qseven®
Product Overview



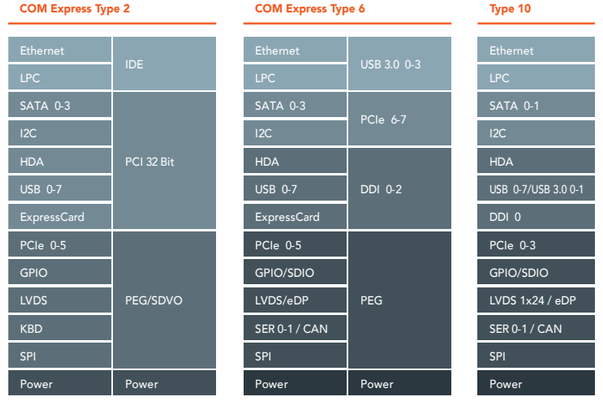
70 x 70 mm²

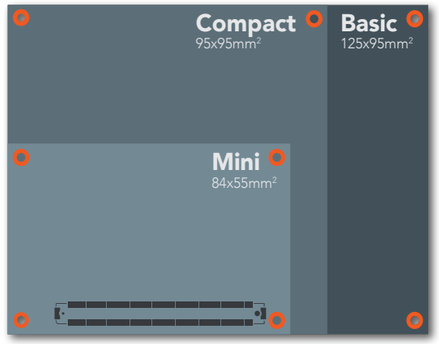
conga-QA3 – High Performance
– 3rd Gen. Intel® Atom™ processor family
– High resolution Intel® Gen. 7 graphics
– Temperature range up to -40°C .. +8

	conga-QMX6	conga-QG	conga-QAF	conga-QA3	conga-QA6
Formfactor	Qseven, 70 x 70 mm²	Qseven, 70 x 70 mm²	Qseven, 70 x 70 mm²	Qseven, 70 x 70 mm²	Qseven, 70 x 70 mm²
CPU	Freescale® i.MX6 Series ARM Cortex A9 i.MX6 Quad, 4x 1.0 GHz i.MX6 Dual, 2x 1.0 GHz Dual Lite, 2x 1.0 GHz i.MX6 Solo, 1.0 GHz	AMD Embedded GX-Series SOC Processors GX-210HA, 2x 1.0 GHz GX-210JA, 2x 1.0 GHz GX-209HA, 2x 1.0 GHz GX-212JC, 2x 1.2 GHz GX-412HC, 4x 1.2 GHz	AMD Embedded G-Series Processors G-T40E, 2x 1.0 GHz G-T40R, 1.0 GHz G-T16R, 615 MHz	Intel® Processors Celeron® J1900 4x 2.0 GHz Celeron® N2930 4x 1.86 GHz Celeron® N2807 1x 1.58 GHz Atom™ E3845 4x 1.91GHz Atom™ E3827 2x 1.75GHz Atom™ E3826 2x 1.46GHz Atom™ E3825 2x 1.33GHz Atom™ E3815 1.46GHz Atom™ E3805 2x 1.33 GHz	Intel® Atom™ E600 Series Processor E680T / E680, 1.6 GHz E640T / E640, 1.0 GHz
DRAM	max. 2 GByte DDR3 1066 MT/s	max. 8 GByte ECC DDR3L 1333 MT/s	max. 4 GByte DDR3L 1066 MT/s	max. 8 GByte dual channel DDR3L 1333 MT/s	max. 2 GByte DDR2 667/800 MT/s
Chipset	-	Integrated in SoC	AMD A55E Controller Hub	Integrated in SoC	Intel® Platform Controller Hub EG20/EG20T
Ethernet	1x 1 Gigabit Ethernet	1x 1 Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet Intel® I210	Micrel® GBit Ethernet Phy KSZ9021RN
I/O Interface Serial ATA	1x	2x	2x	2x	2x
PCI EXPRESS®	1x	4x	4x	3x	3x
USB 2.0	4x and 1x USB OTG	5x	8x	6x	8x
USB 3.0	-	1x	-	1x	-
SDIO	1x	1x	1x	1x	1x
LPC Bus	-	1x	1x	1x	1x
I²C Bus	1x	1x	1x	1x	1x
Additional	1x CAN Bus, 1x UART, Android Buttons	1x UART	2x ExpressCard™	1x SPI	1x CAN Bus
Mass Storage	On board Solid State Drive (eMMC) up to 8 GByte (optional), on board MicroSD socket	Silicon Motion FerriSSD® up to 64GB	On board SATA Solid State Drive up to 32 GByte (optional)	eMMC 4.5 onboard flash up to 32 GByte (optional)	On board SATA Solid State Drive up to 32 GByte (optional)
Sound	I²S, AC97	High Definition Audio Interface	High Definition Audio Interface	High Definition Audio Interface	High Definition Audio Interface
Graphics	Integrated in Freescale i.MX6 Series	Integraded AMD Radeon™ HD 8000E, DirectX®11.1 graphics with UVD 3.0, Dual Simultaneous Display Support	Integrated AMD Radeon™ HD 6250, DirectX®11 graphics with UVD 3.0, Dual Simultaneous Display Support	Intel® HD Graphics with 4 Execution Units	Intel® Graphics Core with 2 D and 3 D Hardware Accelerator
Video Interface	LVDS 2x 24, HDMI		LVDS 2x 24, HDMI, DisplayPort		LVDS 1x18/1x24, Single channel SDVO interface
congatec Board Controller	-	Multi Stage Watchdog, non-volatile User Data Storage, Manufacturing and Board Information, Board Statistics, I²C bus (fast mode, 400 kHz, multi-master), Power Loss Control			
Embedded BIOS Feature	U-Boot boot loader	AMI-Aptio 4 MByte Flash BIOS with congatec Embedded BIOS features		OEM Logo, OEM CMOS Defaults, LCD Control, Display Auto Detection, Backlight Control, Flash Update	
	based on AMI Aptio UEFI				
Power Management	-	ACPI 3.0 compliant, Smart Battery Management		ACPI 5 .0 compliant, Smart Battery Management	ACPI 3.0 compliant, Smart Battery Management
Operating Systems*	Linux, Android, Microsoft® Windows Embedded Compact 7	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded Compact 7, Linux	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded Compact 7, Microsoft® Windows XPE, Linux	Microsoft® Windows 8, Microsoft® Windows Embedded Standard 8, Microsoft® Windows 7, Microsoft® Windows Embedded Compact 7, Microsoft® Windows Embedded Standard 7, Linux	Microsoft® Windows 7, Windows Embedded Compact 7, Microsoft® Windows XPE, Linux
Temperature	Operating: 0 .. +60°C commercial grade -40 .. +85°C industrial grade Storage: -40 .. +85°C		Operating: 0 .. +60°C Storage: -20 .. +80°C	Operating: 0 .. +60°C Storage: -20 .. +80°C	Operating: 0 .. +60°C commercial grade -40 .. +85°C industrial grade Storage: -40 .. +85°C
Humidity	Operating: 10 .. 90 % r. H. non cond. Storage: 5 .. 95 % r. H. non cond.				

COM Express®
the Concept

COM Express® is a PICMG® standard that defines a Computer-On-Module, or COM, packaged as a super component. The defined interfaces provide a smooth transition path from legacy interfaces to modern differential signals. This includes DisplayPort, PCI Express®, USB 3.0 and Serial ATA. congatec was editor within the PICMG® for the COM Express® specifications 2.0 / 2.1 and for the COM Express® Design Guide.





New interfaces
COM Express® defines 440 interconnect pins between the COM Express® module and the carrier board. Legacy buses such as PCI, parallel ATA are supported with type 2 modules. Type 6 modules feature additional PCI Express® 2.0 Lanes, USB 3.0, 3 DisplayPort/HDMI outputs and no longer multiplexes the PEG port with graphic signals.

Legacy Free
COM Express® is a legacy free standard. Outdated interfaces such as floppy, PS/2 keyboard/mouse, LPT are no longer supported. If required, these legacy interfaces can be optionally generated on the customized carrier board.
The Type 6 pin-out definition follows that path. IDE and 32 Bit PCI Bus are replaced by the new video interface DDI (switchable to DVI/HDMI or DisplayPort), additional PCI Express® lanes and the SuperSpeed signals for USB 3.0.

Size
COM Express® describes four different sizes. The major form factors are the Compact (95 x 95 mm²) and the Basic (95 x 125 mm²). The primary difference between the modules is the overall physical size and the performance envelope supported by each.

Thermal Design
As with Qseven® and XTX/ETX, the COM Express® definition includes a heatspreader that acts as a thermal interface between the COM Express® module and the system's cooling solution. All heat generating components are thermally conducted to the heatspreader in order to avoid hot spots.
The heatspreaders and cooling solutions for the high power modules utilize congatecs patented high efficient flat heat pipes in order to allow for maximum performance and highest reliability.

PCI Express®
COM Express® offers up to 24 PCI Express® lanes. This allows the customer to equip their embedded PC application with the next generation of PC performance. PCI Express® is a low pin count interface with maximum bandwidth per pin. PCI Express® is defined for a maximum bandwidth of up to 8 GBit/s per lane and direction.

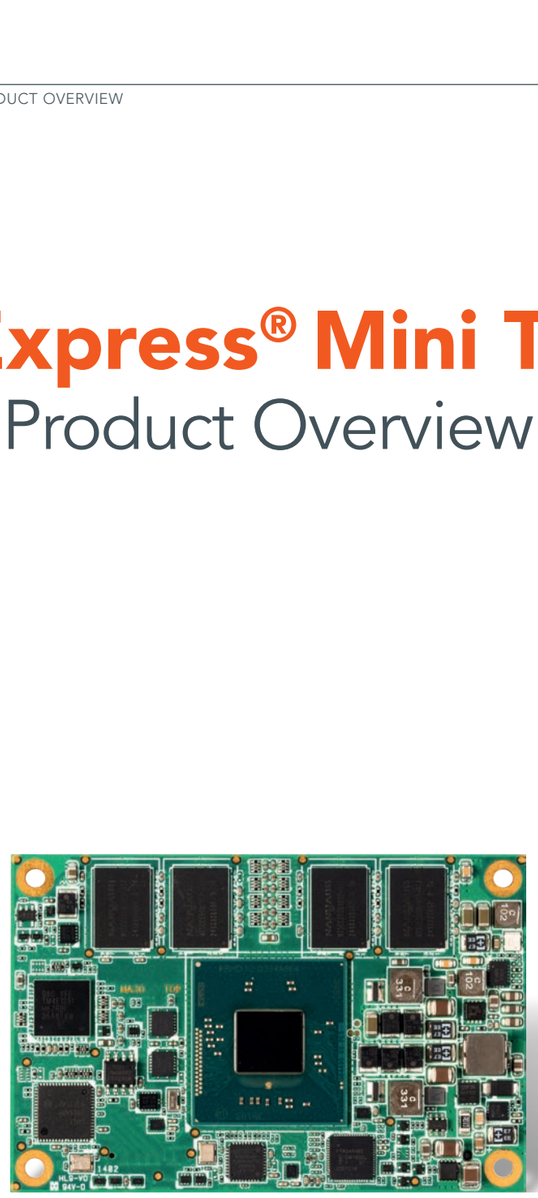
GPIO
COM Express® defines freely usable general purpose inputs and outputs.

PCI Express® Graphics (PEG)
The PEG interface utilizes up to 16 PCI Express® lanes in order to drive an external ultra high performance graphic controller located on the carrier board. The PEG Port is available with the conga-BP77 Type 2 implementation and with most Type 6 modules.

USB
The Type 2 modules feature up to 8 USB 2.0 ports. New with Type 6 are the additional SuperSpeed signals for up to four USBs. Up to 4 USB 3.0 ports (including USB 2.0) and 4 USB 2.0 ports are available now.

Video Output
Common video outputs for Type 2 and Type 6 modules are VGA and LVDS for direct flat panel support. With Type 6, the Intel® SDVO interface was reduced to a maximum of 1 channel. New for Type 6 is the implementation of 3 DDI (Digital Display Interface). Each of the DDI can be switched to TMDS (for DVI or HDMI) or DisplayPort. The current Intel® implementation additionally allows the first DDI to be switched to SDVO mode. Future Type 6 modules will also allow for an embedded Displayport. This eDP interface will be multiplexed with the LVDS A channel.

COM Express® Mini Type 10
Product Overview



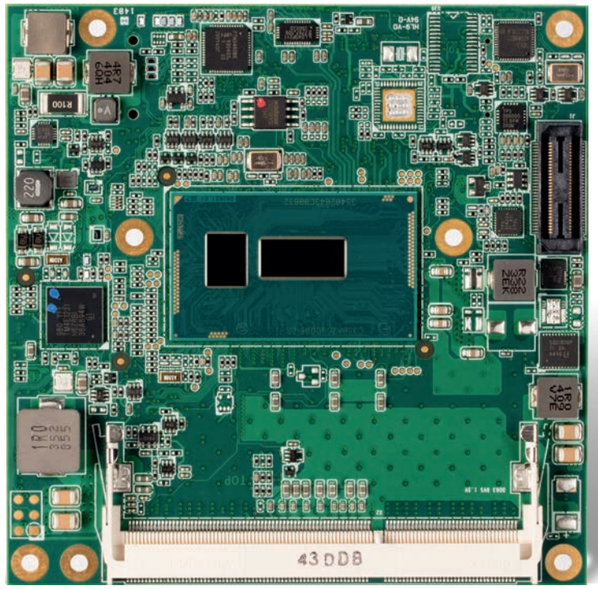
84 x 55 mm²

conga-MA3E – Powerful and Small
– 3rd Gen. Intel® Atom™ processor family
– COM Express Mini Type 10
– ECC protected memory up to 8 GByte
– High resolution Intel® Gen. 7 graphics
– Temperature range up to -40°C .. +85°C

	conga-MA3	conga-MA3E
Formfactor	COM Express® Mini, (55 x 84 mm²), Type 10 Connector Layout	
CPU	Intel® Processors Atom™ E3845 4x 1.91GHz Atom™ E3827 2x 1.75GHz Atom™ E3826 2x 1.46GHz Atom™ E3815 1.46GHz Celeron® N2930 4x 1.86 GHz Celeron® N2807 1.58 GHz	Intel® Processors Atom™ E3845 4x 1.91GHz Atom™ E3827 2x 1.75GHz
DRAM	max. 8 GByte DDR3L 1333 MHz	max. 8 GByte ECC DDR3L 1333 MHz
Chipset	Integrated in SoC	Integrated in SoC
Ethernet	Intel® I218LM GbE Phy.	Intel® I218LM GbE Phy.
I/O Interface Serial ATA	2x	2x
PCI EXPRESS®	4x	4x
USB 3.0	1x	1x
USB 2.0	7x	7x
Sound	Digital High Definition Audio Interface with support for multiple audio codecs	Digital High Definition Audio Interface with support for multiple audio codecs
Graphics	Intel® HD Graphics Gen. 7	Intel® HD Graphics Gen. 7
Video Interface	LVDS 1x 24 bit	LVDS 1x 24 bit
	1x DisplayPort/HDMI	1x DisplayPort/HDMI
congatec Board Controller	Multi Stage Watchdog, Non-volatile User Data Storage, Manufacturing and Board information, Board Statistics, BIOS Setup, Data Backup, I²C (Fast Mode, 400 kHz, Multi	
Embedded BIOS Feature	AMI-Aptio UEFI BIOS	
Security	All congatec COM Express® Basic boards can be optionally equipped with a discrete "Trusted Platform Module" (TPM). It is capable of calculating efficient hash and RSA algorithms with key lengths up to 2,048 bits and includes a real random number generator. Security sensitive applications such as gaming and e commerce will benefit also with improved authentication, integrity and confidence levels.	
Power Management	ACPI 5.0 with Battery support	ACPI 5.0 with Battery support
Operating Systems*	Microsoft® Windows 8, Microsoft® Windows Embedded Standard 8, Microsoft® Windows 7, Windows Embedded Compact 7, Microsoft® Windows Embedded Standard 7, Linux	Microsoft® Windows 8, Microsoft® Windows Embedded Standard 8, Microsoft® Windows 7, Windows Embedded Compact 7, Microsoft® Windows Embedded Standard 7,Linux
Temperature	Operating: 0 .. +60°C commercial grade -40 .. +85°C industrial grade Storage: -40 to +85°C	Operating: 0 .. +60°C
Humidity	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.	Operating: 10 - 90% r. H. non

COM Express® Compact Type 6

Product Overview



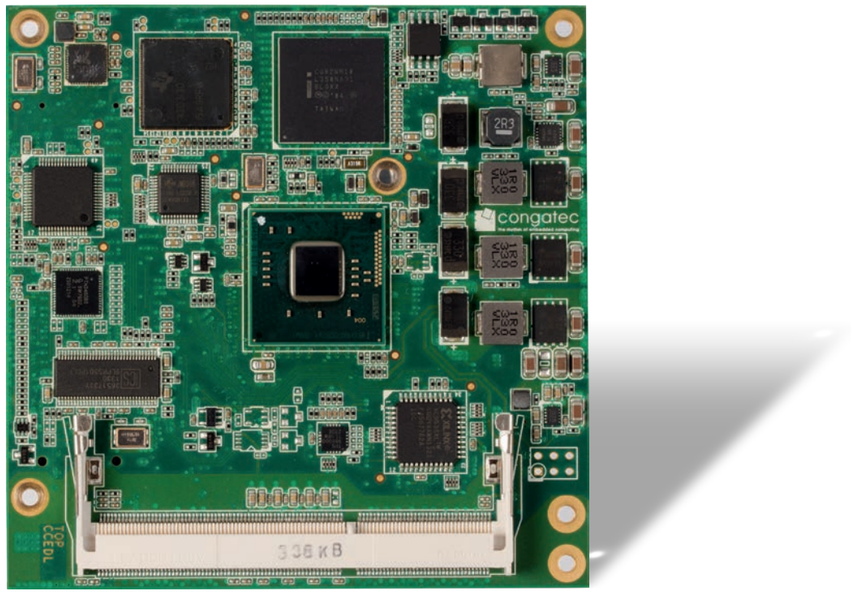
95 x 95 mm²

conga-TC97 – Fast and Compact
- 5th Gen. Intel® Core™ i7 dual core processor
- 3x DisplayPort 1.2, up to 4k resolution
- Intel® AVX 2.0 Vector extension for improved floating point computing
- COM Express Compact Type 6

	conga-TC97	conga-TC87	conga-TCA3	conga-TCA	conga-TCG
Formfactor	Compact, (95 x 95 mm²), Type 6 Connector Layout				
CPU	Intel® Processors Core™ i7-5650U, 2x 2.2 GHz Core™ i5-5350U, 2x 1.8 GHz Core™ i3-5010U, 2x 2.1 GHz	Intel® Processors Core™ i7-4650U, 2x 2.2 GHz Core™ i5-4300U, 2x 1.8 GHz Core™ i3-4010U, 2x 2.1 GHz Celeron® 2980U, 2x 1.7 GHz	Intel® Processors Celeron® J1900 4x 2.0 GHz Celeron® N2930 4x 1.83 GHz Celeron® N2807 1x 1.58 GHz Atom™ E3845 4x 1.91GHz Atom™ E3827 2x 1.75GHz Atom™ E3826 2x 1.46GHz Atom™ E3825 2x 1.33GHz Atom™ E3815 1.46GHz	Intel® Processors Atom™ N2600, 2x 1.6 GHz Atom™ N2800, 2x 1.86 GHz Atom™ D2550, 2x 1.86 GHz	AMD Embedded G-Series Processors GX-420CA, 4x 2.0 GHz GX-415GA, 4x 1.5 GHz GX-217GA, 2x 1.65 GHz GX-210HA, 2x 1.0 GHz GX-411GA, 4x 1.1 GHz GX-209HA, 2x 1.0 GHz GX-424CC, 4x 2.4 GHz GX-412HC, 4x 1.2 GHz
DRAM	max. 32 GByte DDR3L 1600 MHz	max. 32 GByte DDR3L 1600 MHz	max. 8 GByte DDR3L 1333 MHz	max. 4 GByte DDR3 1066 MHz	max. 8 GByte DDR3L 1600 MHz
Chipset	Intel® 9 Series PCH-LP	Intel® 8 Series PCH-LP	Integrated in SoC	Intel® NM10 Express	Integrated in SoC
Ethernet	Intel® I218LM GbE Phy.	Intel® I218LM GbE Phy.	Intel® i210 Gigabit Ethernet	Gigabit Ethernet: Realtek 8111E	Intel® I210 Gigabit Ethernet
I/O Interface Serial ATA	4x	4x	-	2x	2x
PCI EXPRESS®	4x	4x	5x	5x	4x
USB 3.0	2x	2x	1x	2x	2x
USB 2.0	8x	8x	8x	8x	8x
Express Card®	-	2x	-	2x	2x
Sound	Digital High Definition Audio Interface				
Graphics	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics	AMD Radeon HD 8000E
Video Interface	LVDS 2x 24 bit	LVDS 2x 24 bit	LVDS 2x 24 bit	LVDS 1x 24 bit	LVDS 2x 24 bit
	2x DisplayPort/HDMI/DVI	2x DisplayPort/HDMI/DVI	2x DisplayPort/HDMI/DVI	2x DisplayPort/HDMI/DVI	1x DisplayPort/HDMI/DVI
congatec Board Controller	Multi Stage Watchdog, non-volatile User Data Storage, Manufacturing and Board Information, Board Statistics, BIOS Setup, Data Backup, I²C bus (fast mode, 400 kHz, multi-master), Power Loss Control				
Embedded BIOS Feature	AMI-Aptio UEFI BIOS, congatec Embedded BIOS				
Security	All congatec COM Express® Compact boards can be optionally equipped with a discrete "Trusted Platform Module" (TPM). It is capable of calculating efficient hash and RSA algorithms with key lengths up to 2,048 bits and includes a real random number generator. Security sensitive applications such as gaming and e commerce will benefit also with improved authentication, integrity and confidence levels.				
Power Management	ACPI 4.0 with Battery support	ACPI 4.0 with Battery support	ACPI 5.0 with battery support	ACPI 3.0 with Battery support	ACPI 3.0 with Battery support
Operating Systems*	Microsoft® Windows 8, Microsoft® Windows 7, Windows Embedded Standard, Linux	Microsoft® Windows 8, Microsoft® Windows 7, Windows Embedded Standard, Linux	Microsoft® Windows 8, Microsoft® Windows Embedded Standard 8, Microsoft® Windows 7, Microsoft® Windows Embedded Compact 7, Microsoft® Windows Embedded Standard 7, Linux	Microsoft® Windows 8, Microsoft® Windows 7, Windows Embedded Standard 7, Microsoft® Windows XP, Linux	Microsoft® Windows 8, Microsoft® Windows 7, Windows Embedded Compact 7, Windows Embedded Standard, Linux
Temperature	Operating: 0 .. +60°C Storage: -20 .. +80°C				
Humidity	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.				

COM Express® Compact Type 2

Product Overview



95 x 95 mm²

conga-CCA

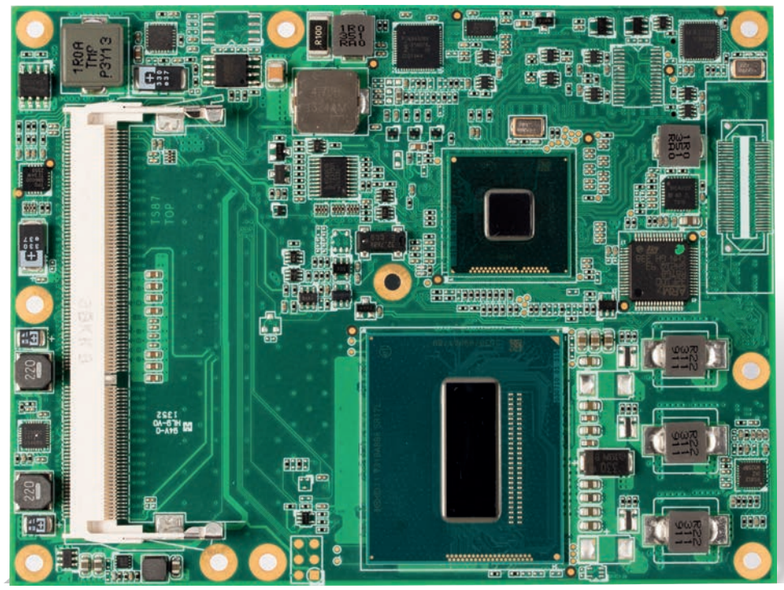
– Intel® Atom™ Dual Core Generation on 32nm
– Only 3.5 Watt TDP on Intel® Atom™ Processor N2600
– HD video performance 2D/3D
– Up to 4 GB DDR3 memory

conga-CCA

Formfactor	COM Express® Compact, (95 x 95 mm²), Type 2 Connector Layout
CPU	Intel® Processors Atom™ D2550 2x 1.86 GHz Atom™ N2800 2x 1.86 GHz Atom™ N2600 2x 1.6 GHz
DRAM	max. 4 GByte DDR3 1066 MHz
Chipset	Intel® NM10
Ethernet	Realtek RTL8111E
I/O Interface Serial ATA	2x
PCI EXPRESS®	4x
USB 2.0	8x
Express Card®	2x
EIDE	1x
Sound	Digital High Definition Audio Interface with support for multiple audio codecs
Graphics	OpenGL 3.0 and DirectX9 support
Video Interface	LVDS 2x 24 bit
	1x DisplayPort/HDMI/DVI
congatec Board Controller	Multi Stage Watchdog, non-volatile User Data Storage, Manufacturing and Board Information, Board Statistics, BIOS Setup, Data Backup, I²C bus (fast mode, 400 kHz, multi-master), Power Loss Control
Embedded BIOS Feature	AMI-Aptio UEFI BIOS
Security	All congatec COM Express® Basic boards can be optionally equipped with a discrete "Trusted Platform Module" (TPM). It is capable of calculating efficient hash and RSA algorithms with key lengths up to 2,048 bits and includes a real random number generator. Security sensitive applications such as gaming and e commerce will benefit also with improved authentication, integrity and confidence levels.
Power Management	ACPI 3.0 with Battery support
Operating Systems*	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded Standard, Microsoft® Windows XP, Linux
Temperature	Operating: 0 .. +60°C Storage: -20 to +80°C
Humidity	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.

COM Express® Basic Type 6

Product Overview



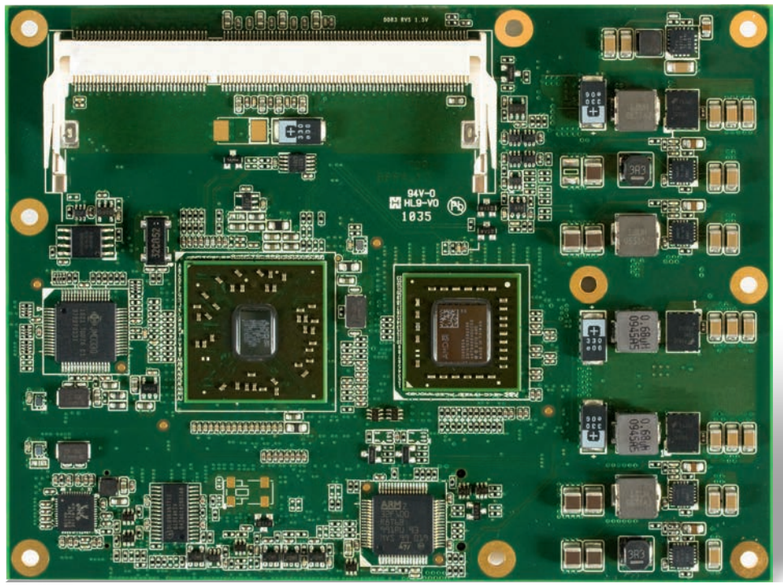
95 x 125 mm²

conga-TS87 – High End Performance
– 4th Gen. Intel® Core™ i7 quad core processor
– 3x DisplayPort 1.2, up to 4k resolution
– COM Express Basic Type 6
– Intel® AES-NI for hardware accelerated encryption an decryption

	conga-TFS	conga-TS87	conga-TS77	conga-TS67
Formfactor	COM Express® Basic, (95 x 125 mm²), Type 6 Connector Layout			
CPU	AMD Embedded R-Series Processors R-464L, 4x 2.3 GHz R-460H, 4x 1.9 GHz R-272F, 2x 2.7 GHz	Intel® Processors Core™ i7-4700EQ, 4x 2.4 / 3.7 GHz Core™ i5-4400E 2x 2.7 / 3.3 GHz Core™ i5-4402E 2x 1.6 / 2.7 GHz Core™ i3-4100E 2x 2.4 GHz Core™ i3-4102E 2x 1.6 GHz Celeron® 2000E 2x 2.2 GHz Celeron® 2002E 2x 1.56 GHz	Intel® Processors Core™ i7-3615QE, 4x 2.3 GHz Core™ i7-3612QE, 4x 2.1 GHz Core™ i7-3555LE, 2x 2.5 GHz Core™ i7-3517UE, 2x 1.7 GHz Core™ i5-3610ME, 2x 2.7 GHz Core™ i3-3120ME, 2x 2.4 GHz Core™ i3-3217UE, 2x 1.6 GHz Celeron® 847E, 2x 1.1 GHz Celeron® 827E, 1x 1.4 GHz Celeron® 927UE, 1x 1.5 GHz Celeron® 1020E, 2x 2.2 GHz Celeron® 1047UE, 2x 1.4 GHz	Intel® Processors Core™ i3-2340UE, 2x 1.3 GHz Core™ i7-2610UE, 2x 1.5 GHz Core™ i7-2655LE, 2x 2.2 GHz Celeron® B810E, 2x 1.6 GHz
DRAM	max. 32 GByte DDR3L 1600 MHz	max. 32 GByte DDR3L 1600 MHz	max. 32 GByte DDR3 1600 MHz	max. 32 GByte DDR3 1333 MHz
Chipset	AMD A70M Controller Hub	Intel® DH82QM87 and DH82HM86 PC	Intel® BD82QM77 PCH	Intel® BD82QM67 PCH / Intel® BD82HM65 (for Celeron)
Ethernet	Realtek RTL81111GN	Intel® I218LM GbE Phy.	Intel® 82579LM GbE Phy	Intel® 82579LM GbE Phy
I/O Interface Serial ATA	4x	4x	4x	4x
PCI EXPRESS®	7x	7x	7x	7x
PEG	1x	1x	1x	1x
USB 3.0	4x	4x	4x	-
USB 2.0	8x	8x	8x	8x
Express Card®	2x	2x	2x	2x
Sound	Digital High Definition Audio Interface with support for multiple audio codecs	Digital High Definition Audio Interface with support for multiple audio codecs	Digital High Definition Audio Interface with support for multiple audio codecs	Digital High Definition Audio Interface with support for multiple audio codecs
Graphics	AMD Radeon HD 7000G Series Graphics	Intel® HD Graphics	Intel® HD Graphics 4000	Integrated High Performance Video
Video Interface	LVDS 2x 24 bit	LVDS 2x 24 bit	LVDS 2x 24 bit	LVDS 2x 24 bit
	3x DisplayPort/HDMI/DVI	3x DisplayPort/HDMI/DVI	3x DisplayPort/HDMI/DVI	3x DisplayPort/HDMI/DVI
			1x SDVO	1x SDVO
congatec Board Controller	Multi Stage Watchdog, non-volatile User Data Storage, Manufacturing and Board Information, Board Statistics, BIOS Setup, Data Backup, I²C bus (fast mode, 400 kHz, multi-master), Power Loss Control			
Embedded BIOS Feature	AMI-Aptio UEFI BIOS	AMI-Aptio UEFI BIOS	AMI-Aptio UEFI BIOS	AMI-Aptio UEFI BIOS
Security	All congatec COM Express® Basic boards can be optionally equipped with a discrete "Trusted Platform Module" (TPM). It is capable of calculating efficient hash and RSA algorithms with key lengths up to 2,048 bits and includes a real random number generator. Security sensitive applications such as gaming and e commerce will benefit also with improved authentication, integrity and confidence levels.			
Power Management	ACPI 3.0 with Battery support	ACPI 4.0 with Battery support	ACPI 3.0 with Battery support	ACPI 3.0 with Battery support
Operating Systems*	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded Standard, Microsoft® Windows XP, Linux	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded, Linux	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded Standard, Microsoft® Windows XP, Linux	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded Standard, Microsoft® Windows XP, Linux
Temperature	Operating: 0 .. +60°C Storage: -20 .. +80°C	Operating: 0 .. +60°C Storage: -20 .. +80°C	Operating: 0 .. +60°C Storage: -20 .. +80°C	Operating: 0 .. +60°C Storage: -20 .. +80°C
Humidity	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.

COM Express® Basic Type 2

Product Overview

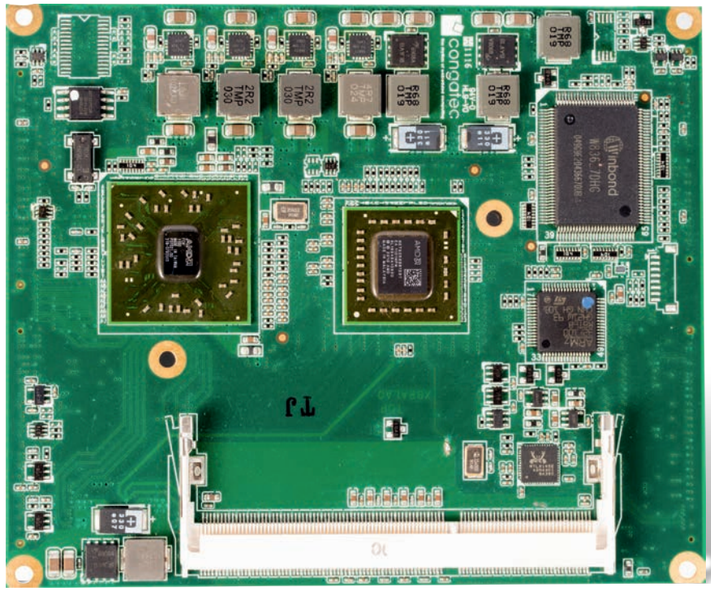


95 x 125 mm²

conga-BAF
– Based on AMD embedded G-Series Processors
– Best price/performance ratio
– High performance graphics

	conga-BP77/BS77	conga-BM67/BS67	conga-BM57/BS57	conga-BAF
Formfactor	COM Express® Basic, (95 x 125 mm²), Type 2 Connector Layout			
CPU	conga-BP77/BS77 Intel® Processors Core™ i7-3612QE 4x 2.1/3.1 GHz Core™ i7-3555LE 2x 2.5/3.2 GHz Core™ i7-3517UE 2x 1.7/2.8 GHz Core™ i5-3610ME 2x 2.7/3.3 GHz Core™ i3-3120ME 2x 2.4 GHz conga-BS77 Intel® Processors Core™ i7-3615QE 4x 2.3/3.3 GHz Core™ i3-3217UE 2x 1.6 GHz Celeron® 927UE, 1x 1.5 GHz Celeron® 1020E, 2x 2.2 GHz Celeron® 1047UE, 2x 1.4 GHz	conga-BM67: Intel® Processors Core™ i7-2710QE, 4x 2.1/3.0 GHz Core™ i5 -2510E, 2x 2.5/3.1 GHz Core™ i3-2330E, 2x 2.2 GHz Celeron® B810, 2x 1.6 GHz conga-BS67: Intel® Processors Core™ i7-2655LE, 2x 2.2/2.9 GHz Core™ i7-2610UE, 2x 1.5/2.4 GHz Core™ i3-2340UE, 2x 1.3 GHz	conga-BM57: Intel® Processors Core™ i7-620M, 2x 2.66/3.33 GHz Core™ i5-520M, 2x 2.4/2.93 GHz Celeron® P4500, 2x 1.86 GHz conga-BS57: Intel® Processors Core™ i7-620LE, 2x 2.0/2.8 GHz Core™ i7-620UE, 2x 1.06/2.13 GHz Core™ i3-330E, 2x 2.13 GHz Celeron® U3405, 2x 1.07 GHz	AMD Embedded G-Series Processors G-T56N, 2x 1.6 GHz G-T40N, 2x 1.0 GHz G-T44R, 1.2 GHz G-T40R, 1.0 GHz G-T40E, 2x 1.0 GHz
DRAM	max. 32 GByte DDR3 1600 MHz	max. 32 GByte DDR3L 1600 MHz	max. 16 GByte DDR3 1333 MHz	max. 16 GByte DDR3 1333 MHz
Chipset	Intel® BD82QM77 PCH / BD82HM76 (for Celeron®)	Intel® BD82QM67 PCH / BD82HM65 (for Celeron®)	Intel® BD82HM55 PCH	A55E Controller Hub
Ethernet	Intel® 82579LM GbE Phy	Intel® 82579LM GbE Phy	Intel® 82577LM GbE Phy	Realtek RTL8111E
I/O Interface Serial ATA	4x	4x	4x	4x
PCI EXPRESS®	6x	6x	6x	6x
PEG	1x (only conga-BP77)	-	-	-
USB 2.0	8x	8x	8x	8x
Express Card®	-	2x	2x	2x
EIDE	1x	1x	1x	1x
Sound	Digital High Definition Audio Interface with support for multiple audio codecs	Digital High Definition Audio Interface with support for multiple audio codecs	Digital High Definition Audio Interface with support for multiple audio codecs	Digital High Definition Audio Interface with support for multiple audio codecs
Graphics	Intel® HD Graphics 4000	Intel® HD Graphics 3000	Intel® HD Graphics 4000	Integrated High Performance Video
Video Interface	LVDS 2x 24 bit	LVDS 2x 24 bit	LVDS 2x 24 bit	LVDS 2x 24 bit
	3x DisplayPort/HDMI/DVI (only conga-BS77)	3x DisplayPort/HDMI/DVI	3x DisplayPort/HDMI/DVI	2x DisplayPort/HDMI
	1x SDVO (only conga-BS77)	1x SDVO	1x SDVO	1x DisplayPort/HDMI/SDVO
congatec Board Controller	Multi Stage Watchdog, non-volatile User Data Storage, Manufacturing and Board Information, Board Statistics, BIOS Setup, Data Backup, I²C bus (fast mode, 400 kHz, multi-master), Power Loss Control			
Embedded BIOS Feature	AMI-Aptio UEFI BIOS	AMI-Aptio UEFI BIOS	AMI-Aptio UEFI BIOS	AMI-Aptio UEFI BIOS
Security	All congatec COM Express® Basic boards can be optionally equipped with a discrete "Trusted Platform Module" (TPM). It is capable of calculating efficient hash and RSA algorithms with key lengths up to 2,048 bits and includes a real random number generator. Security sensitive applications such as gaming and e commerce will benefit also with improved authentication, integrity and confidence levels.			
Power Management	ACPI 3.0 with Battery support	ACPI 3.0 with Battery support	ACPI 3.0 with Battery support	ACPI 3.0 with Battery support
Operating Systems*	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded Standard, Microsoft® Windows XP, Linux	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded, Linux	Microsoft® Windows 7, Microsoft® Windows Embedded Standard, Microsoft® Windows XP, Linux	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded Standard, Microsoft® Windows XP, Linux
Temperature	Operating: 0 .. +60°C Storage: -20 .. +80°C	Operating: 0 .. +60°C Storage: -20 .. +80°C	Operating: 0 .. +60°C Storage: -20 .. +80°C	Operating: 0 .. +60°C Storage: -20 .. +80°C
Humidity	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.	Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.

XTX™ / ETX®
Product Overview

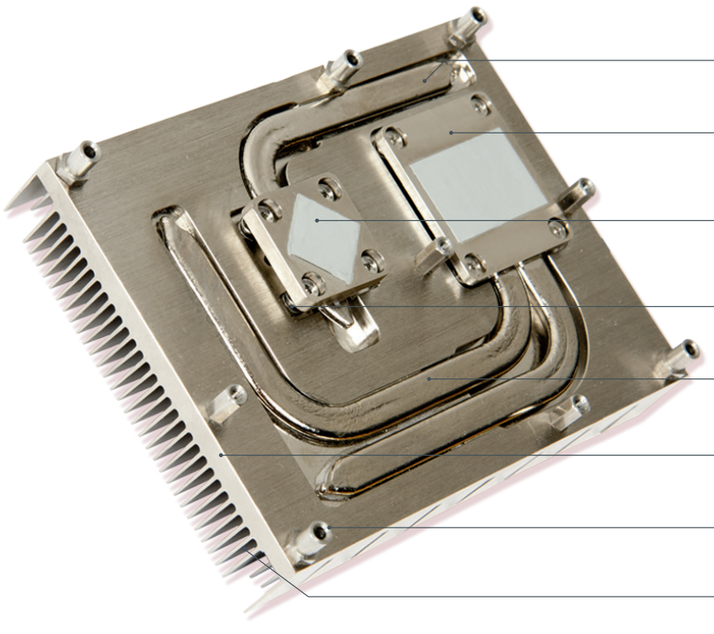


95 x 114 mm²

conga-XAF
– XTX™ Modules
– Enhanced lifetime for ETX®
– Featuring PCI Express® and SATA
– High scalability
– ETX® compatible, no ISA Bus

	conga-XAF	conga-XLX	conga-EAF	conga-ELX	conga-ELXeco
Formfactor	XTX™ Extensions, 95 x 114 mm²	XTX™ Extensions, 95 x 114 mm²	ETX® Spec. 3.02, 95 x 114 mm²	ETX® Spec. 2.7, 95 x 114 mm²	ETX® Spec. 2.7, 95 x 114 mm²
CPU	AMD Embedded G-Series Processors G-T56N, 2x 1.6 GHz G-T40R, 1x 1.0 GHz G-T40E, 2x 1.0 GHz	AMD Geode™ LX 800, 500 MHz	AMD Embedded G-Series Processors G-T56N, 2x 1.6 GHz G-T44R, 1x 1.2 GHz G-T40R, 1x 1.0 GHz G-T40E, 2x 1.0 GHz	AMD Geode™ LX 800, 500 MHz	AMD Geode™ LX 800, 500 MHz
DRAM	max. 4 GByte DDR3 1066 MHz	max. 1 GByte DDR333	max. 4 GByte DDR3 1066 MHz	max. 4 GByte DDR3 1066 MHz	max. 4 GByte DDR3 1066 MHz
Chipset	AMD A55E Controller Hub	AMD® Geode CS5536	AMD A55E Controller Hub	AMD® Geode CS5536	AMD® Geode CS5536
Ethernet	Realtek RTL8105E	Realtek RTL8105E	Realtek RTL8105E	Realtek RTL8105E	Realtek RTL8105E
I/O Interface Serial ATA	4x	2x	4x	4x	4x
PCI EXPRESS®	4x	-	-	4x	4x
PCI Bus	-	-	√	√	√
Compact Flash®	-	-	-	-	-
USB 2.0	6x	4x	4x	6x	6x
Express Card®	2x	-	-	2x	2x
EIDE	2x	2x	2x	2x	2x
Sound	Digital High Definition Audio Interface with support for multiple audio codecs	AC'97 digital audio interface	High Definition Audio Interface	AC'97 Rev.2.2 compatible, Line In, Line Out, Mic In	AC'97 Rev.2.2 compatible, Line In, Line Out, Mic In
Graphics	Integrated High Performance Video	Integrated High Performance Video	Integrated High Performance Video	Integrated in chipset up to 254 MByte graphic memory (UMA)	
Video Interface	VGA	VGA	VGA	VGA	VGA
	LVDS 2x 24 bit	LVDS 1x 18 bit	LVDS 2x 24 bit	LVDS 1x 18 bit	LVDS 1x 18 bit
	1x DisplayPort/HDMI	-	1x DisplayPort/HDMI	-	-
congatec Board Controller	Multi Stage Watchdog, Non-volatile User Data Storage, Manufacturing and Board information, Board Statistics, BIOS Setup, Data Backup, I²C (Fast Mode, 400 kHz, Multi				
Embedded BIOS Feature	AMI-Aptio UEFI BIOS	OEM Logo, OEM CMOS Defaults, LCD Control, (Auto Detection, Backlight Control), Flash Update, Based on Insyde XpressROM	AMI-Aptio UEFI BIOS	OEM Logo, OEM CMOS Defaults, LCD Control, (Auto Detection, Backlight Control), Flash Update, Based on Insyde XpressROM	
Security	This congatec XTX™ modules can be optionally equipped with a discrete „Trusted Platform Module" (TPM).	-	-	-	-
Power Management	ACPI 3.0 with Battery support	ACPI 2.0 with Battery support	ACPI 3.0 with Battery support	APM 1.2	APM 1.2
Operating Systems*	Microsoft® Windows 8, Microsoft® Windows 7, Windows Embedded Compact 7, Microsoft® Windows XP, Microsoft® Windows CE 6.0, Microsoft® Windows® embedded Standard, Linux	Microsoft® Windows XP, Microsoft® Windows CE 6.0, Microsoft® Windows® embedded Standard, Linux	Microsoft® Windows 8, Microsoft® Windows 7, Microsoft® Windows Embedded Compact 7, Microsoft® Windows XP, Microsoft® Windows CE 6.0, Microsoft® Windows® embedded Standard, Linux	Microsoft® Windows XP, Microsoft® Windows CE 6.0, Microsoft® Windows® embedded Standard, Linux	Microsoft® Windows XP, Microsoft® Windows CE 6.0, Microsoft® Windows® embedded Standard, Linux
Temperature	Operating: 0 .. +60°C Storage: -20 ..+80°C	Operating: 0 .. +60°C Storage: -20 ..+80°C	Operating: 0 .. +60°C Storage: -20 ..+80°C	Operating: 0 .. +60°C Storage: -20 ..+80°C	Operating: 0 .. +60°C Storage: -20 ..+80°C
Humidity	Operating: 10 - 90% r. H. non Storage: 5 - 95% r. H. non cond.	Operating: 10 - 90% r. H. non Storage: 5 - 95% r. H. non cond.	Operating: 10 - 90% r. H. non Storage: 5 - 95% r. H. non cond.	Operating: 10 - 90% r. H. non Storage: 5 - 95% r. H. non cond.	Operating: 10-90% r. H. non Storage: 5 - 95% r. H. non cond.

congatec cooling solutions



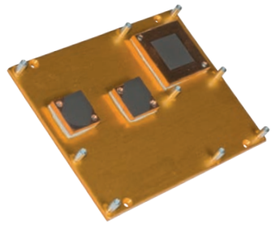
congatec's smart cooling pipes pave the way for unlimited performance growth for COM Express® modules

The new cooling system based on cooling pipes which are integrated in the standardized heatspreader of the COM Express specification. With this solution it becomes possible to cool next generation high-performance processors with a power dissipation of well over 35W TDP. The real problem are the hot spots around the processor and chipset. The congatec improved cooling concept results in a lower processor temperature, which is essential for a more frequent activation of Intel® Turbo Boost 2 Technology to ensure maximum COM performance and energy efficiency. As a result, the processor can operate at higher levels than the maximum permitted thermal design power (TDP).

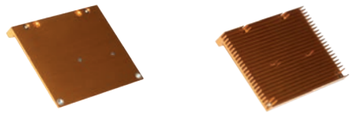
The advantages at a glance:
– Fast spot cooling for full performance
– Elimination of gap filler layer
– Elimination of mechanical stress leads to higher quality
– Better cooling extends the life span of the module
– Heat pipe principle enables innovative customer-specific cooling concepts

congatec's new heat pipe cooling design is available in different variants comprising a passive, active and customer-specific solution that creates space for innovative ideas. For example, the heat pipe can be designed in such a way that it can be connected to a customer-specific heat sink. Fanless designs are possible provided the casing is equipped with appropriately sized cooling fins. Ultimately, the design depends on the specific application. The key features of the concept are equally applicable to other electronic circuits.

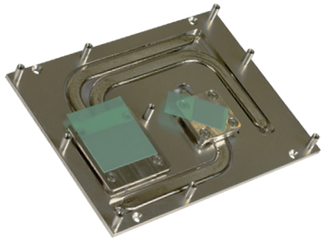
The new cooling solution is also ideal for systems with low power dissipation. The modules have a higher thermal reserve, which increases their life span and reliability. Average temperature reductions of 5 Kelvin can double the statistical life span – a convincing argument when considering the total cost over the lifetime of a system.



Heatspreader

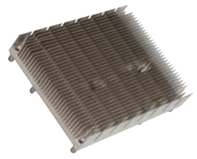


Heatspreader and passive cooling solution for Qseven®



Heatpipe Heatspreader

Passive cooling solution



Active cooling solution

Standard cooling solution

Heatspreader Concept
The specifications for Qseven®, COM Express®, XTX™ and ETX® embedded computer modules include a heatspreader definition, which is the mechanical thermal interface. All the heat generated by power consuming components such as chipsets and processors is transferred to the system's cooling via the heatspreader. This can be achieved by either a thermal connection to the casing, a heat pipe or a heat sink.

Heatspreader Mounting
congatec heatspreader solution are optimized for vertically and horizontally mounted applications. All thermal stacks are fixed in place through the use of pins to ensure that there is no movement. Depending on top or bottom mounting versions with through holes or threads are available.

Cooling Solutions
Compared with sandwich-type constructions for heatspreaders and cooling systems, active and passive cooling solutions remove one layer from the process. The heatspreader and cooler are manufactured as one unit, which enables them to provide faster thermal conduction. For an active cooling solution, a high performance quiet fan has been integrated within the cooling fins.

Heatspreaders featuring Heatpipes
The congatec heatspreaders and cooling solutions for the high performance modules are featuring heatpipes in order to boost performance and reliabiltiy. A copper block is mounted on the chip to absorb heat and to mitigate the effects of thermal peaks. Between the chip and the copper block, a phase-change material is placed to improve the heat transmission. To account for different component heights and manufacturing tolerances, the copper block is spring loaded to apply an optimized pressure to the silicon dye. The copper block and the cooling fins or heat plate are connected by flexible flat heatpipes.
All this results in fast spot cooling, good thermal connections, elimination of mechanical stress and greater cooling performance. This leads to while retaining geometric dimensions – achieving all these requirements sounds like asking the impossible. However, congatec has mastered the challenge by skilfully combining the classical solution with a structurally modified heat pipe. Unlike the classical design, a flattened heat pipe is used to transfer heat from the chip to the heat spreader plate. The heat pipe is attached directly to the cooling blocks on the chip and the heatspreader plate. As a result, more heat is transported from the processor environment to the heatspreader, hot spots are cooled more quickly and the processor is cooled more optimally. Spiral springs with defined spring tension, as well as the heat pipe itself with its flexible height, put optimum pressure on the processor chip.

Qseven®
Engineering Tools

conga-QKit

This complete kit provides the ability to start evaluating Qseven® modules immediately.

- conga-QEVAL evaluation carrier board
- conga-LDVI LVDS to DVI converter
- conga-FPA2 evaluation flat panel adapter
- SATA-to-CF card adapter
- SATA-to-IDE converter
- ATX power supply
- Complete cable set
- congatec USB memory stick

conga-QKIT/ARM

This complete kit provides the ability to start evaluating Qseven® ARM modules immediately

- Qseven® module based on Freescale's new i.MX6 ARM Cortex A9 processors conga-QMX6/QC-2G (PN: 016103)
- conga-QEVAL/ARM Qseven® evaluation carrier board for standard Qseven® ARM modules
- conga-LDVI/EPI LVDS to DVI converter board for digital flat panels with onboard EEPROM
- conga-ACC/I2S Audio card adapter with I2S/ HDA codec
- conga-HDMI ADD2 card to connect a HDMI display
- MicroSDHC-Card 8 GByte Contains a ready to go bootloader image (Ubuntu Oneiric)
- HDMI to DVI-D adapter
- Standard ATX power supply (180 Watt)
- Cable set

Qseven® Mobility Kit

This kit provides the ability to start immediately evaluating Qseven® modules for all kinds of mobile applications.

- Qseven® module based on AMD Embedded G-Series Processors conga-QAF/T40R-2G (015300)
- Mini carrier board for Qseven® conga-MCB/ Qseven® DP (020731)
- congatec Smart Battery Manager Module conga-SBM3/Qseven®
- Adapter for generic LVDS panels
- USB memory stick with the latest drivers
- Universal power supply (19V, 90W),
- Rechargeable Smart Li-Ion battery pack, 2 cells, 7.2V, 4.56Ah with battery connector adapter
- 7" TFT widescreen touch monitor 800x480, LVDS
- USB touch controller
- Cable set

Qseven® Mini Carrier Board

Mini Carrier Board for Qseven® with smart battery manager interface for mobile applications and SDVO display interface support for Intel® mobile platforms.

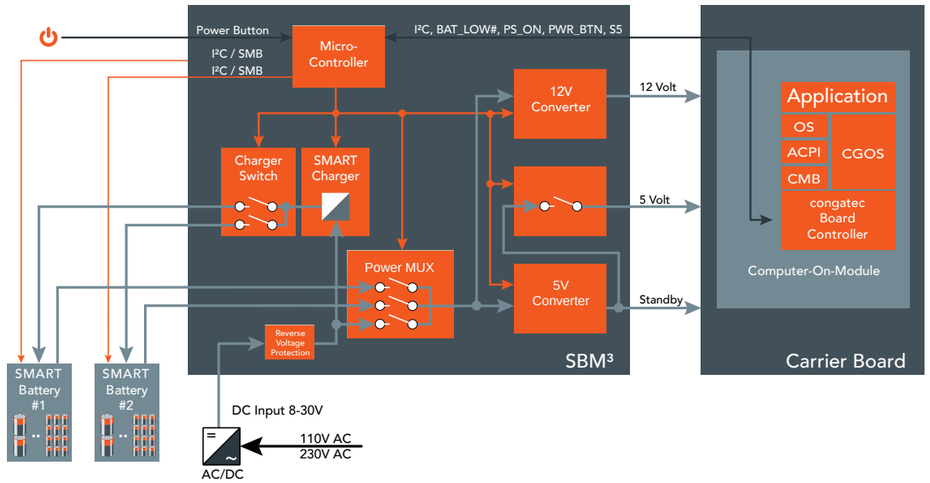
- Small size: 95 x 145 mm
- 1x miniPCI Express Socket
- 1x RJ45 connector with GB Ethernet transformer
- 1x CFAST Socket, 1x SATA, 1x 8 bit SD Card socket
- 2x USB at the front panel, 4x USB on pin header
- 1x Display Port or 1x HDMI
- Dual LVDS 18/24 bits
- High Definition Audio, two 3.5' Jack on front panel, SPDIF on header
- CAN transceiver
- Power button/reset button/mini card WIFI radio disable/sleep button/ LID button
- Versions for SDVO (conga-QA & conga-QA6), DisplayPort (conga-QAF) and ARM (conga-QMX6)

conga-QEVAL

Evaluation board for Qseven® modules. To achieve a quick start with Qseven® congatec offers an evaluation carrier board, which routes all the Qseven® signals to standard interface connectors.

- 4x PCI Express® x1, 1x ExpressCard, 1x Mini PCI Express Card, 1x SDIO Card Socket
- Gigabit Ethernet, 6x USB 2.0 + 1x client, 2x SATA
- MIC, Line In, Line Out, SPDIF
- LPC POST code display, System speaker
- Power button, Reset button, LID button, Sleep button
- PCI Express® switch, external BIOS flash
- I²C EEPROM, aux signals for battery management
- 1x Dual Channel LVDS
  1x SDVO, HDMI or Display Port
- Backlight control
- 12 V single power input, ATX power input connector, CMOS battery

COM Express®
Engineering Tools

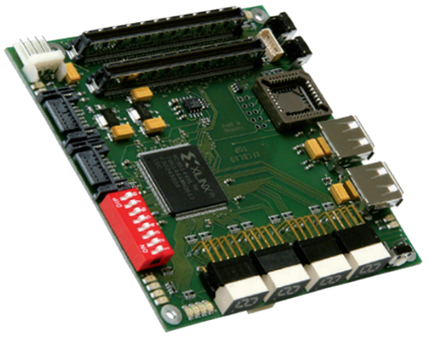


In combination with an ACPI operating system, the battery functionality associated with mobile platforms is supported by congatec embedded computers. Now it's much easier to build mobile embedded applications that have notebook battery functionality.

SMART Battery Manager Module

conga-SBM³ is a complete battery manager sub system. It is designed for the use with low power congatec COM Express® compact modules and congatec Qseven® modules.

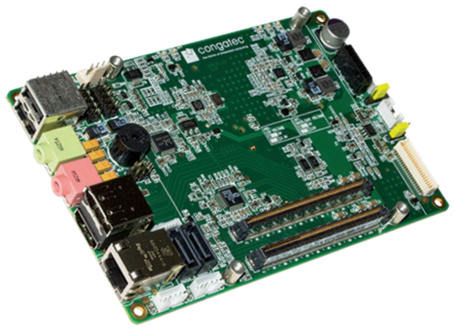
- Supports battery two smart batteries with configurations 2S up to 4S
- Dual charge and discharge for high efficiency
- S3 (Suspend to RAM) / S5 (Soft-Off) support
- Zero current from batteries in off mode
- LEDs provide a direct view of charging and battery capacity status
- Input voltage of 8 - 30V DC, with input power delimitation
- Output 12V / ~35W, 5V / ~20W
- Battery charging max. 4A or 2x 2A in dual charge mode
- Temperature: Operating: 0 .. +70°C, Storage: -25 .. +80°C



conga-Cdebug

COM Express® Debug Platform. The conga-Cdebug provides a debug platform for your application specific carrier board. Simply use it as a transparent debug interface between your carrier board and the COM Express® module.

- Supports battery two smart batteries with configurations 2S up to 4S
- Dual charge and discharge for high efficiency
- S3 (Suspend to RAM) / S5 (Soft-Off) support
- Zero current from batteries in off mode
- LEDs provide a direct view of charging and battery capacity status
- Input voltage of 8 - 30V DC, with input power delimitation
- Output 12V / ~35W, 5V / ~20W
- Battery charging max. 4A or 2x 2A in dual charge mode
- Temperature: Operating: 0 .. +70°C, Storage: -25 .. +80°C



conga-MCB|COM Express Mini Carrier Board

Full featured carrier board for COM Express® Compact Type 2.

- 1x miniPCI Express Socket
- 1x RJ45 connector with integrated Gigabit Ethernet Transformer
- 1x CFAST Socket, 2x SATA, 1x 4 bit SD Card Socket
- 2x USB at the front panel, 4x USB pin header
- On board PC speaker, Line Out, Mic In at front panel
- 1x Display Port from DDI port C and 1x HDMI from SDVO port B
- LVDS interface (EPI - Embedded Panel Interface) 40 pin 1 mm 2 rows box header
- Backlight connector, 4 pin 2.00 mm box header
- On board lithium battery for CMOS backup and real time clock
- All signals for ACPI battery support (conga-SBMC[3]) at the feature connector
- 5pin Micro-Fit Power Connector, 3pin Fan header, 12V, tacho signal
- Size 145 x 95 mm

conga-CEVAL

Evaluation carrier board for COM Express® Type 2 modules

- To achieve a quick start with COM Express® congatec offers an evaluation carrier board, which routes all the COM Express® signals to standard interface connectors. Supports COM Express® Compact and Basic modules using connector Pinout Type 2.
- 4x1 PCI Express®, 1x Express Card, 1x 16 PCI Express® Graphics (PEG), 1x Mini PCI Express® Card, 4x 32 bit PCI
- Gigabit Ethernet
- 6x USB
- HDA compatible codec
- AC97 optional via connector
- 4x SATA, 1x PATA
- 2x COM, 1x LPT, 1x Floppy, PS2 kbd./mouse
  PCI/LPC Postcode display
  System speaker, Power button, Reset button, CMOS Battery
- CRT connector, LVDS interface

conga-TEVAL

Evaluation carrier board for COM Express® Type 6 modules.

- To achieve a quick start with COM Express® congatec offers an evaluation carrier board, which routes all the COM Express® signals to standard interface connectors. Supports COM Express® Compact and Basic modules using connector Pinout Type 6.
- 6x1 PCI Express®, 1x Express Card, 1x 16 PCI Express® Graphics (PEG), 1x Mini PCI Express® Card
- Gigabit Ethernet
- 6x USB
- 2x COM, 1x LPT, 1x GPIO/SDIO, LPC Postcode display
  System speaker, Power button, Reset button, CMOS Battery
- CRT connector, LVDS interface

Online

Find more in depth information at www.congatec.com

- Product search and overview
- All data sheets
- All users manuals
- Design guides
- Schematics for the evaluation carrier boards
- Drivers and board support packages for all major operating systems
- All accessories
- Application notes
- ... always up to date

Or visit our video channel at www.congatec.com/youtube.com

- Product videos
- Technical videos
- Webinars
- Educational videos
- Trade show videos
- Partner videos
- Design qualification videos
- ... and some more

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Headquarters

congatec AG

Auwiesenstraße 5
94469 Deggendorf
Germany

Phone +49 (991) 2700-0
Fax +49 (991) 2700-111

info@congatec.com
www.congatec.com

Subsidiaries

congatec Asia Ltd.

14F-2, No. 270, Sec 4,
Zhongxiao E. Rd.
106 Taipei City, Taiwan

Phone +886 (2) 2775-4645
Fax +886 (2) 2775-3263

sales-asia@congatec.com
www.congatec.tw

congatec, Inc.

6262 Ferris Square
San Diego
CA 92121 USA

Phone +1 (858) 457-2600
Fax +1 (858) 457-2602

sales-us@congatec.com
www.congatec.us

congatec Japan K.K.

Shiodome building 301,
Minato-ku Hamamatsucho 1-2-7,
105-0013 Tokyo-to, Japan

Phone +81 3 (6435) 925-0
Fax +81 3 (6435) 925-1

sales-jp@congatec.com
www.congatec.jp

congatec Australia Pty Ltd.

Unit 2, 62 Township Drive
West Burleigh
Queensland 4219, Australia

Phone +61 (7) 55200-841

sales-au@congatec.com
www.congatec.com.au

congatec China Technology Ltd.

Sunyoung Center, 901 Building B,
No. 28 Xuanhua Road, Changning District,
Shanghai 200050, China

Phone +86 (21) 6025-5862
Fax +86 (21) 60256561

sales-asia@congatec.com
www.congatec.cn